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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,133	08/16/2001	Hiroshi Hozoji	500.40506X00	1256
20457	7590	11/19/2003		
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-9889				
			EXAMINER CHAMBLISS, ALONZO	
			ART UNIT 2827	PAPER NUMBER

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/930,133	HOZOJI ET AL.	
	Examiner	Art Unit	
	Alonzo Chambliss	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003 and 30 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21, 23-27, 30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21, 23-27, 30 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Amendment A filed on 5/19/03 and amendment B filed on 5/30/03 have both been fully considered and made of record in Paper Nos. 7 and 8, respectively.
2. The substitute specification filed on 5/30/03 has been fully considered and made of record in Paper No. 9.

Response to Arguments

3. Applicant's arguments filed 5/19/03 have been fully considered but they are not persuasive.

In response to Applicant's argument that the strip 3 taught by Launay does not function as a stress relaxing layer as the claimed invention, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Applicant alleges that Launay's strip 3 is not formed by printing resin on the support 2. This argument is deemed not persuasive because the phrase "by printing" makes the claim a "product by process" claim. In a "product by process" claim, the claim is directed to the product per se, no matter how actually made, *In re Brown*, 190 USPQ 15 at 17 (footnote 3) and *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or

obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not.

Applicant alleges that Launay fails to disclose or even hint at forming an insulating layer on the wiring substrate. This argument is deemed not persuasive because Launay discloses an insulating layer 3 (i.e. thermoplastic material) on the wiring substrate 2 (see col. 1 lines 61-64 and col. 4 lines 31-40).

In response to Applicant's argument that there is not suggestion to combine the reference, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. *In re Nomiya*, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole suggests to one of ordinary skill in the art. *In re McLaughlin*, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. *In re Bozek*, 163 USPQ 545 (CCPA) 1969. In the case, Launay discloses a thermoplastic material utilized in a semiconductor device (see col. 1 lines 54-67). Yukawa discloses a thermoplastic material made of resin utilized in a semiconductor device. Thus, Launay and Yukawa have substantially the same environment. Therefore, one skilled in the art at the time of the invention would readily recognized that an insulating resin is can be a thermoplastic material, since a thermoplastic resin is used in high temperature

electronic packaging applications and relieve stress between devices of different material as taught by Yukawa.

In regards to an environment without utilizing an underfill. Lee is relied upon to show that a semiconductor device 10 can be mounted on a wiring substrate 20 (i.e. body 20 have leads 23A, 23B on the surface) without using an underfill (see Figs. 1A, 1C, 2, and 3). Therefore, this action is made **final**.

Drawings

4. The drawings were received on 7/16/03. These drawings are approved by the examiner.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. In claim 26, the phrase " between wiring formed on said insulating material and that located external to said semiconductor module " is vague and indefinite since it is not clear what is referred to as **that**.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 2, 5-8, 10-14, 24, 26, 27, 30, and 31, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Launay (U.S. 6,320,753) in view of Yukawa (U.S. 6,436,733).

With respect to Claims 1, 2, 26, and 27, Launay discloses a wiring substrate 2 (i.e. support with connection terminal 9 and wiring 15 on which wiring 15 is formed. A semiconductor device 1 is electrically connected to the wiring 9, 15 by connection terminals 17 electrically connected to the wiring 15, the external connection terminal 8 arranged on a same side of the wiring substrate 2 to which the semiconductor device 1 is mounted (see col. 1 lines 40-53 and col. 4 lines 31-59; Figs. 2-27). A thermoplastic

material layer (i.e. insulating strip layer 3) has a inclined portion at a given inclination to the mounting surface and a flat portion which is almost flat and which is thicker than the semiconductor device 1 between the wiring substrate 2 and the external connection terminal 8 (see col. 1 lines 61-67; Figs. 2-27). Pad of the wiring 15 is formed on the inclined portion of the insulating strip layer 3. The insulating layer 3 is formed on a circumferential portion of the substrate 2 (see Figs. 4 and 5). The external connection electrode 8 enables electrical connection between wiring 15 formed on the insulating material 3 to external devices located external to the module. Launay does not explicitly disclose insulating strip layer 3 utilized as a stress relaxing layer as the claimed invention. However, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). Therefore, the strip layer taught by Launay discloses the same structure as the claimed invention. Launay does not explicitly disclose a thermoplastic material including a resin. However, Yukawa discloses thermoplastic material 12a, 12b in the form of a resin (see col. 4 lines 14-18). Therefore, one skilled in the art would have readily recognized that an insulating resin is made of thermoplastic material, since a thermoplastic resin is used in high temperature electronic packaging applications and relieve stress between devices having different material as taught by Yukawa.

With respect to Claim 5, Launay discloses wherein the insulating resin layer 3 has a shape of almost enclosing said semiconductor device 1 (see F g. 3).

With respect to Claim 6, Launay discloses wherein the insulating resin layer 3 is frame-shaped (see Figs. 4, 5, and 10-12).

With respect to Claim 7, Launay discloses wherein an inclination of an inner circumferential side has a gradual slope than that of an outer circumferential side of the insulating resin layer 3 (see Fig. 10).

With respect to Claims 8, 30, and 31, Launay discloses the claimed invention except for a plurality of insulating resin layers are used instead of insulating resin layer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of insulating resin layers instead of one insulating layer, since it has been held that mere duplication of the essential working pads of a device involves routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. Therefore, one skilled in the art at the time of the invention would readily recognize having a plurality of insulating resin layers outside the peripheral portion of the substrate, since the plurality resin layers would improve the stress between devices created by each component made of different materials.

With respect to Claim 10, Yukawa discloses wherein the insulating resin layer 12a may be made of an insulating material having an elastic modulus of 3Gpa (see col. 4 lines 14-21).

With respect to Claim 11, Yukawa discloses wherein a film thickness of the insulating resin layer 12a is between 50 micrometers (see col. 12 lines 15-17).

With respect to Claim 12, Yukawa discloses: wherein the semiconductor device is a ball grid array (BGA) (see Fig. 1), since the external connecting terminals can be

placed on the external connection terminal (i.e. contact zones) of Launay to provide external connection to an external device, and an wafer-level CSP.

With respect to Claims 13 and 14, Launay discloses wherein a sum of a thickness of the insulating resin layer 3 and a height of the external connection terminal 8 is greater than and almost equal to the distance from the mounted surface of the semiconductor device 1 to a rear surface thereof (see Figs. 4 and 5).

With respect to Claim 24, Launay discloses a metal member 17 connecting said semiconductor device to the substrate 2 (see Figs. 13-16).

With respect to Claim 27, Launay discloses an intermediate plate 15 in the insulating material 3 between the semiconductor device 1 and the external connection terminal 8 (see Figs. 4 and 5).

10. Claims 3 and 4, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Launay (U.S. 6,320,753) and Yukawa (U.S. 6,436,733) as applied to claim 1 above, and further in view of Shoji (U.S. 6,054,171).

With respect to Claims 3 and 4, Launay-Yukawa both fail to disclose wherein the insulating resin layer is formed by mask printing. However, it is well known when applying a resin layer or film that mask printing is used as a technique to precisely control the thickness of the resin as evidenced by Shoji (see col. 7 lines: 59-63). Furthermore, the phrase "by printing" makes the claim a "product by process" claim. In a "product by process" claim, the claim is directed to the product per se, no matter how actually made, *In re Brown*, 190 USPQ 15 at 17 (footnote 3) and *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se

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which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Launay (U.S. 6,320,753) and Yukawa (U.S. 6,436,733) as applied to claim 1 above, and further in view of Hembree (U.S. 6,242,932).

With respect to Claim 9, Launay-Yukawa does not explicitly disclose the wiring substrate that is made of glass. However, it is well known in the semiconductor industry that a substrate can be made of glass as evidenced by Hembree (see col. 5 lines: 66-67). Therefore, one skilled in the art at the time of the invention would readily recognize utilizing glass for the material of the substrate, since the glass provides a stable material for attaching semiconductor devices on as taught by Hembree.

12. Claims 15-19, 21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Launay (U.S. 6,320,753) and Yukawa (U.S. 6,436,733) as applied to claims 1 and 2 above, and further in view of Lee (U.S. 5,986,334).

With respect to Claims 15-17 and 25, Launay-Yukawa both disclose the claimed invention except for a semiconductor device mounted on a wiring substrate without using an underfill. However, Lee discloses a semiconductor device 10 mounted on a wiring substrate 20 (i.e. a body 20 having leads 23A, 238 on the surface) without using an underfill. The semiconductor device is die attached to the substrate 20 by wire bonding (see Figs. 1A, 1C, 2 and 3). Therefore, it would have been obvious to one skilled in the art to attach a semiconductor device without using an underfill, since wire

bonding the semiconductor device to the wiring substrate would not require an underfill as taught by Lee.

With respect to Claim 18, Yukawa discloses wherein the insulating resin layer 12a may be made of an insulating material having an elastic modulus of 3Gpa (see col. 4 lines 14-21).

With respect to Claim 19, Yukawa discloses wherein a film thickness of the insulating resin layer 12a is between 50 micrometers (see col. 12 lines 15-17).

With respect to Claim 21, Launay discloses the claimed invention except for a second insulating resin layer are used instead of insulating resin layer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a second insulating resin layer instead of one insulating layer, since it has been held that mere duplication of the essential working pads of a device involves routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. Therefore, Launay discloses applicant's claimed invention of a second insulating resin layer. 21

13. Claim 20 is rejected under 36 U.S.C. 103(a) as being unpatentable over Launay (U.S. 6,320,753)-Yukawa (U.S. 6,466,733) and Lee (U.S. 5,986,334) as applied to claims 1 and 16 above, and further in view of Shoji (U.S. 6,064, 171).

With respect to Claim 20, Launay-Yukawa-Lee all fail to disclose wherein the insulating resin layer is formed by mask printing. However, it is well known when applying a resin layer or film that mask printing is used as a technique to precisely control the thickness of the resin as evidenced by Shoji (see col. 7 lines 59-63). Furthermore, the phrase " mask printing " makes the claim a " product by process "

claim. In a "product by process" claim, the claim is directed to the product per se, no matter how actually made, In re Brown, 190 USPQ 15 at 17 (footnote 3) and In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/November 16, 2003

A handwritten signature in black ink, appearing to read 'Alonzo Chambliss', is positioned above the printed name.

Alonzo Chambliss
Patent Examiner
Art Unit 2827